

the valley was refilled, and the mastodons and the other animals were buried in the debris. Probably at a late time in the first interglacial stage the basalt was belched out and this material crowned the mountain. That this basaltic flow occurred at a somewhat advanced time in the Pleistocene is shown by the presence of remnants of basalt in Stanislaus canyon, 1,500 feet above the river.⁹

In regard to the reputed discovery of human relics in the auriferous gravels the writer believes that Professor Holmes did good service when he pointed out the inadequacy of the evidence furnished. Nevertheless, some of those asserted discoveries of human bones and artifacts in previously undisturbed auriferous gravels may have been real. If so, such remains of man's framework and of his handiwork would prove, not the existence of Tertiary man, but of man of the second stage of the Pleistocene. The case becomes then one of perhaps fifty in our country in which relics of man are so closely associated with early Pleistocene vertebrates that the efforts of some of the ablest geologists have been taxed to cast doubt on the meaning of the association.

BOTANY.—*Notes on Disterigma*.¹ S. F. BLAKE, Bureau of Plant Industry.

The subgenus or section *Disterigma* of *Vaccinium*, proposed by Klotzsch² in 1851 for eight South American species, was raised to generic rank almost simultaneously in Niedenzu³ and Drude⁴ in 1889. Drude placed the genus in the tribe *Vaccinieae*, while Niedenzu, on the strength of the leaf anatomy, referred it to the *Thibaudieae*. Hörold, in his treatment⁵ of the American *Thibaudieae*, placed *Disterigma* next to *Oreanthes* Benth. and listed 13 species (two of doubtful position), divided into two groups according to the entire or serrate leaf margin, a somewhat variable and unsatisfactory basis for separation. The 22 species now known form a compact group, probably generically distinct from *Vaccinium*, but perhaps later to be united with some one of the related South American genera when the whole tribe is studied monographically. For the present, however, it seems best to retain *Disterigma* as a genus, characterized chiefly by its usually

⁹ LINDGREN, op. cit., p. 215.

¹ Received May 29, 1926.

² *Linnaea* 24: 57. 1851.

³ *Bot. Jahrb. Engler* 11: 160. 18 June 1889. See also pp. 209-210, 247.

⁴ In *Engl. & Prantl. Nat. Pflanzenfam.* 4¹: 52. Aug. 1889.

⁵ *Bot. Jahrb. Engler* 42: 251-334. 1909.

solitary and sessile generally tetramerous flowers with the ovary embraced by two comparatively large bracts. Of the known species, two occur in Costa Rica and Panama, the others in the Andes from Venezuela and Colombia to Bolivia and Peru.

The genus *Vacciniopsis* Rusby, described in 1893 and compared with *Vaccinium* but not with *Disterigma*, can not be separated from the latter. The original species, *V. ovata*, is distinct from any described *Disterigma*, while the second, *V. tetramera*, described by Rusby in 1920, is apparently identical with *D. dendrophilum* (Benth.) Niedenzu.

The following notes are based on material of *Disterigma* in the National Herbarium, supplemented by a number of specimens lent for study from the Gray Herbarium and the New York Botanical Garden; through the kindness of Dr. B. L. Robinson and Dr. N. L. Britton.

***Disterigma elassanthum* Blake, sp. nov.**

Shrub, with long leafy branches and fastigiate branchlets, these densely rusty-pilose with loosely spreading to ascending hairs; leaves ovate, small, sharply acuminate, entire; flowers axillary, solitary, sessile; bracts orbicular, at first equaling the ovary; corolla subglobose, about 3.5 mm. long; filaments glabrous, 0.6 mm. long, the anthers 1.6 mm. long, the tubules twice as long as the sacs.

"Shrubby vine," 70 cm. high and more; branches mostly denudate of leaves, with gray fissured bark, grayish-pilose or glabrescent; petioles 0.5–1 mm. long; leaf blades 6–9 mm. long, 2.5–4 mm. wide, rounded or subcordate at base, coriaceous, dull green above, pale beneath, obscurely ciliate toward tip or glabrous, narrowly pale-margined; pedicels obsolescent, bearing about 2 pairs of bracts, the uppermost pair suborbicular, 2 mm. long, finely ciliate; ovary glabrous, 1.5–2 mm. long, the calyx limb 1.5 mm. long, the 4 teeth deltoid, acuminate, glabrous; corolla apparently white, depressed-subglobose with broad mouth, 3 mm. long in natural position (4 mm. when teeth are erected), 3.3 mm. thick, the 4 spreading deltoid acute teeth 1.5 mm. long, nearly 2 mm. wide at base; stamens 8, 2 mm. long, the broad glabrous filaments 0.6 mm. long, the anthers 1.6 mm. long (the sacs 0.5 mm. long, the tubules conic, 1.1 mm. long, the slits 0.5–0.6 mm. long).

COLOMBIA: Edge of bog, "Balsillas," on Río Balsillas, Dept. Huila, alt. 2100–2200 m., 3–6 Aug. 1917, *H. H. Rusby & F. W. Pennell* 827 (TYPE no. 1,041,504, U. S. Nat. Herb.; duplicate in Gray Herb.).

In habit and foliage this species closely agrees with the figure of *D. acuminatum* (H. B. K.) Niedenzu. Kunth did not himself see the flowers of that species, but they are described by Weddell, evidently from specimens of the original collection, since no other is cited. According to Weddell the filaments are pilose and about equal the anthers, and the tubules are slightly longer than the anther sacs, characters very different from those shown by the stamens of *D. elassanthum*.

***Disterigma leiopodandrum* Blake, sp. nov.**

Undershrub; branches spreading-hirtellous; leaves elliptic to ovate-elliptic, small, acuminate to a usually obtusish apex, glandular-serrulate; pedicels solitary, 2–11 mm. long, bearing 2 or 3 pairs of bracts, the uppermost orbicular, equaling the ovary at anthesis; calyx lobes deltoid; corolla obovoid-urceolate, 7 mm. long, glabrous except for a few glands outside toward apex; filaments glabrous, 5.2 mm. long, the anthers 2.2 mm. long, the tubules slightly shorter than the sacs.

Caespitose undershrub, fastigiately branched, about 10 cm. high, very leafy; petioles broad, 0.5 mm. long; leaf blades 4.5–6 mm. long, 1.2–2.6 mm. wide, cuneate at base, pale green, coriaceous, often boat-shaped, glabrous above or sparsely hirtellous at base of blade, bearing a few appressed often dark-tipped elongate glands beneath, the lateral veins about 3 pairs, evident or obsolete beneath; flowers solitary, axillary; pedicels spreading-hirtellous, variable in length; uppermost pair of bracts obscurely ciliolate, 3 mm. long, at first equaling or slightly exceeding the ovary, soon surpassed by it; ovary glabrous, 2 mm. long, about equaled by the calyx limb, the 4 teeth deltoid, acute, 1.2 mm. long, obscurely or not ciliolate; corolla obovoid-urceolate, 7 mm. long, about 3.5 mm. thick (as pressed), deep red, above bearing a few subglandular hairs, the 4 teeth triangular, 0.8 mm. long, erect; stamens 8, 7 mm. long, the filaments 5.2 mm. long, glabrous or with about four hairs toward middle, the anthers 2.2 mm. long (the sacs 1.2 mm. long, the broad tubules 1 mm.); berry "white;" seeds obovoid, ridged on one side, favose, brown, 1.2 mm. long.

COLOMBIA: In wet sphagnum on paramo, "Llano de Paletara," Cordillera Central, Dept. El Cauca, alt. 2950–3100 m., 15–17 June 1922, *F. W. Pennell* 6928 (TYPE no. 1,143,622, U. S. Nat. Herb.).

Of the *D. empetrifolium* group, and distinguished particularly by its nearly or quite glabrous filaments.

***Disterigma codonanthum* Blake, sp. nov.**

Shrubby; branchlets spreading-hirtellous; leaves elliptic, small, obtusely acuminate, glandular-serrulate; flowers axillary, solitary, subsessile; bracts equaling or at first surpassing the ovary; corolla campanulate, about 7 mm. long, glabrous; stamens shortly exserted; filaments hirsute, 4.2 mm. long, the anthers 3.2 mm. long, the tubules shorter than the sacs.

Apparently low, fastigiately branched, very leafy; petioles broad, 0.5 mm. long; leaf blades 6–8 mm. long, 1.5–2.5 mm. wide, cuneate-rounded at base, glabrous above, sparsely dark-glandular beneath, coriaceous, pale green, the lateral veins 1–2 pairs, often evident beneath; pedicels about 1 mm. long, bearing about 2 pairs of bracts, the uppermost pair (subtending the ovary) suborbicular, many-nerved, 3.5 mm. long, obscurely ciliolate; ovary glabrous, about 2.5 mm. long, the calyx limb 3–3.5 mm. long, its 4 teeth about 2.6 mm. long, 1.5 mm. wide at base; corolla (red ?) 7 mm. long (with teeth erected), about 5 mm. thick, glabrous, the 4 teeth deltoid, reflexed, 3 mm. long and wide; stamens 8, 6.8 mm. long, the filaments 4.2 mm. long, spreading-hirsute except toward base, the anthers 3.2 mm. long (the granulose sacs 2 mm. long, the rather definitely distinguished tubules 1.2 mm. long, the linear-elliptic pores 0.7 mm. long).

ECUADOR: Ecuadorian Andes, 1857–9, *R. Spruce* 5138 (TYPE in Gray Herb.); photograph and fragment, U. S. Nat. Herb.).

The type was distributed as a *Vaccinium*, under a manuscript name that has since been used in that genus for another species. *D. codonanthum* is distinguished from all except *D. pernettyoides* (Griseb.) Niedenzu by its broadly campanulate corolla. In *D. pernettyoides* the corolla is considerably larger (1–1.3 cm. long), the stamens are not exerted, and the tubules are longer than the anther sacs.

***Disterigma pentandrum* Blake, sp. nov.**

Undershrub; branchlets spreading-puberulous; leaves ovate to elliptic, small, obtuse, entire, thick and essentially veinless, marginate; flowers axillary, solitary, subsessile, 5-merous; bracts slightly surpassing ovary, oval-ovate, acutish, ciliate; calyx segments triangular, considerably longer than ovary, glandular-ciliate; corolla cylindrical-urceolate, 10 mm. long, sparsely glandular outside above; stamens 5, the filaments 3.2 mm. long, pilose, the anthers 5.2 mm. long, the tubules somewhat exceeding the sacs.

Branches up to 28 cm. long, finely gray-puberulous, leafy; petioles 1 mm. long or less; leaf blades 7–12 mm. long, 4–7 mm. wide, obtuse or rounded, rounded at base, fleshy-coriaceous, strongly wrinkled on both sides when dry but without definite veins, glabrous, light green above, pale or brownish beneath, with thickened pale margins; pedicels obsolescent, bearing about 3 pairs of crowded bracts, the uppermost (subtending the ovary) 2.2 mm. long; ovary about 1.8 mm. long, (3- or) 5-celled, glabrous; calyx limb 2.8 mm. long, the 5 lobes triangular, acuminate, 2.2–2.6 mm. long, 1 mm. wide at base, erect; corolla (reddish?) 10 mm. long, 3 mm. thick, fleshy, glabrous inside, the 5 erect triangular-oblong obtuse teeth 1.8 mm. long; stamens 7.8 mm. long; filaments not at all connate, pilose inside except toward the broadened base; anther sacs 2.4 mm. long, passing gradually into the conic tubules, these 2.5–2.8 mm. long, the slits 2.2–2.4 mm. long.

ECUADOR: Vicinity of Huigra, mostly on the Hacienda de Licay, 3 Sept. 1918, *J. N. & G. Rose* 22512 (TYPE no. 1,022,164, U. S. Nat. Herb.); vicinity of La Chonta, 16–17 Oct. 1918, *Rose, Pachano, & Rose* 23470.

In every character except its pentamerous flowers this plant is clearly a *Disterigma*, and since *D. ovatum* shows both 4- and 5-merous flowers (with 8 or 10 stamens), *D. pentandrum* may be received into the same genus. It is distinguished from all other species of the genus by its 5 stamens. In a flower of no. 23470 dissected the ovary was 3-celled, although the other floral parts were pentamerous. In Hörold's key to genera this species run to *Oreanthes* Benth., because of its 5 stamens. In that monotypic genus the filaments are connate into a tube, and the corolla is described as 10 lines long.

DISTERIGMA DENDROPHILUM (Benth.) Niedenzu.

Vaccinium dendrophilum Benth. Pl. Hartw. 219. 1846.

Disterigma dendrophilum Niedenzu, Bot. Jahrb. Engler 11: 224. 1889.

Vacciniopsis tetramera Rusby, Descr. New S. Amer. Pl. 77. 1920.

The unique type of *Vacciniopsis tetramera* in the Columbia University Herbarium, sent for examination by the kindness of Dr. N. L. Britton, appears to belong to *D. dendrophilum*. The type collection of that species (*Hartweg* 1204) has not been examined, but *Spruce* 5403 (in the Gray Herbarium), distributed under that name, is evidently the same as Rusby's plant, although the anthers are longer. *Rusby* 2026, from Bolivia, is identical with the type of *V. tetramera*, and inseparable from *Spruce* 5403.

Disterigma pachyphyllum (Hemsl.) Blake.

Vaccinium pachyphyllum Hemsl. Biol. Centr. Amer. Bot. 2: 275. 1881.

This Costa Rican species is related to *D. alaternoides* (H. B. K.) Niedenzu, and Hörold's record of that species from Central America doubtless refers to it.

Disterigma ovatum (Rusby) Blake.

Vacciniopsis ovata Rusby, Bull. Torrey Club 20: 434. Pl. 170. 1893.

The flowers in this species, the type of the genus *Vacciniopsis*, are both 4- and 5-merous on the same specimen, and the plant is clearly a member of the genus *Disterigma*. Its closest ally is *D. popenoei* Blake, of Ecuador, which has more strongly 3-nerved leaves, more numerous flowers (about 6 in a fascicle), narrower white corollas rather densely spreading-puberulous outside, and different stamens. In *D. popenoei* the filaments are 5 mm. long and pilose on both sides except toward base, the anther sacs are 1 mm. long, and the tubules 2 mm. In *D. ovatum* the filaments are 2.8 mm. long, pilose only above the middle, the anther sacs 1.5 mm. long, and the tubules 1.7 mm. In Dalla Torre & Harms' Index, *Vacciniopsis* is placed in a different tribe (*Thibaudieae*) from *Disterigma*. It is not mentioned in Hörold's revisionary treatment of the American representatives of that tribe.

BOTANY.—*Tetrastylis*, a genus of *Passifloraceae*.¹ ELLSWORTH P. KILLIP, U. S. National Museum.

Tetrastylis, a genus of *Passifloraceae*, was established by Barbosa Rodriguez² in 1882, and to it was assigned a single Brazilian species, *Tetrastylis montana* Barb. Rodr. The description of the plant was very complete, and was accompanied by an excellent illustration. The principal points of difference between this genus and its nearest relative, *Passiflora*, as noted by Barbosa, were:

TETRASTYLIS

1. Four styles.
2. Gynophore curved.
3. Stamen filaments united beyond gynophore, only the extremities free.
4. Four placentae.

PASSIFLORA

1. Three styles.
2. Gynophore straight.
3. Stamen filaments free from gynophore to extremities.
4. Three placentae.

In the *Natürlichen Pflanzenfamilien*³ Harms recognized *Tetrastylis* as a valid genus, placing it immediately before *Passiflora*. In the *Index Kewensis* it was given as a synonym of *Passiflora* and *Tetrastylis montana* was identified with *Passiflora ovalis*, a plant figured by

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² Rev. Engenharia 4: 260. 1882.

³ P. 86. 1894.